ORDER NO. SD82032144C2

Service Manual

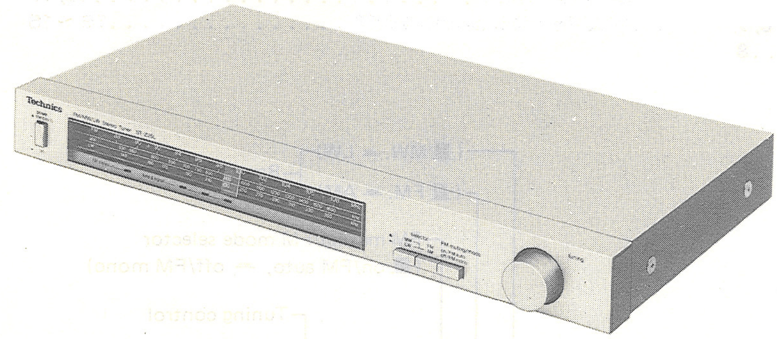
FM/MW/LW Stereo Tuner

ST-Z25L

[EX], [EK], [EF], [EB]

ST-Z25L(K)

[EX]



* The cabinet and front panel are available in black color and silver types.
* The black type model is provided with (K) in the Service Manual.

Areas

* [EX] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [EF] is available in France.
* [EB] is available in Belgium.

Specifications

(Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	88~108 MHz
Sensitivity	2.0 μV (IHF, usable)
S/N 30 dB	2.0 μV (300Ω), 1.0 μV (75Ω)
S/N 26 dB	1.8 μV (300Ω), 0.9 μV (75Ω)
S/N 20 dB	1.6 μV (300Ω), 0.8 μV (75Ω)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Frequency response	20 Hz~15 kHz, +0.5 dB~ −1.5 dB
Alternate channel selectivity	
normal (±400 kHz)	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	55 dB
IF rejection at 98 MHz	70 dB
Spurious response rejection at 98 MHz	80 dB
AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	
MW	525~1605 kHz
LW	145~350 kHz
Sensitivity (S/N 20 dB)	
MW	20 μV, 300 μV/m
LW	50 μV
Selectivity (± 9kHz)	
MW	27 dB (1000 kHz)
LW	35 dB (250kHz)
Image rejection	
MW	40 dB (1000 kHz)
LW	40 dB (250 kHz)
IF rejection	
MW	65 dB (1000 kHz)
LW	40 dB (250 kHz)

■ GENERAL

Output voltage	0.3V (0.6V, IHF)
Power consumption	8W
Power supply	AC 50 Hz/60 Hz, 220V (For continental Europe) AC 50 Hz/60 Hz, 240V (For United Kingdom)
Dimensions (W×H×D)	430 × 53 × 251 mm (16-15/16" × 2-3/32" × 9-7/8")
Weight	2.7 kg (6.0 lb.)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

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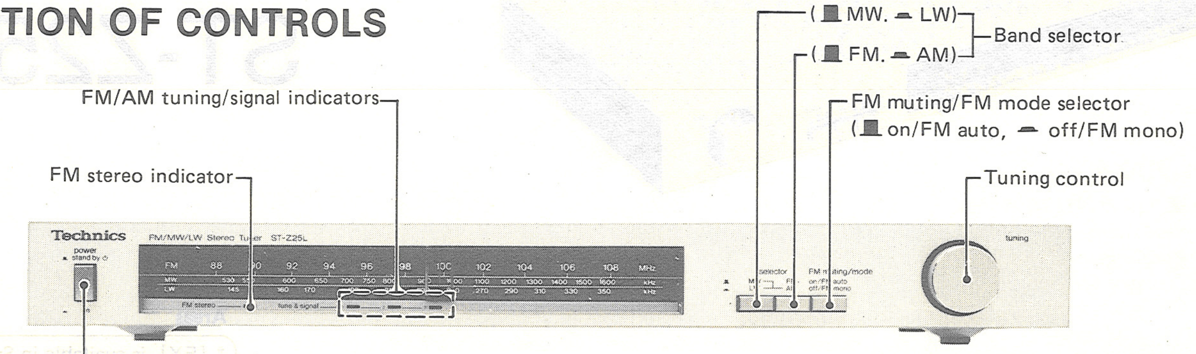
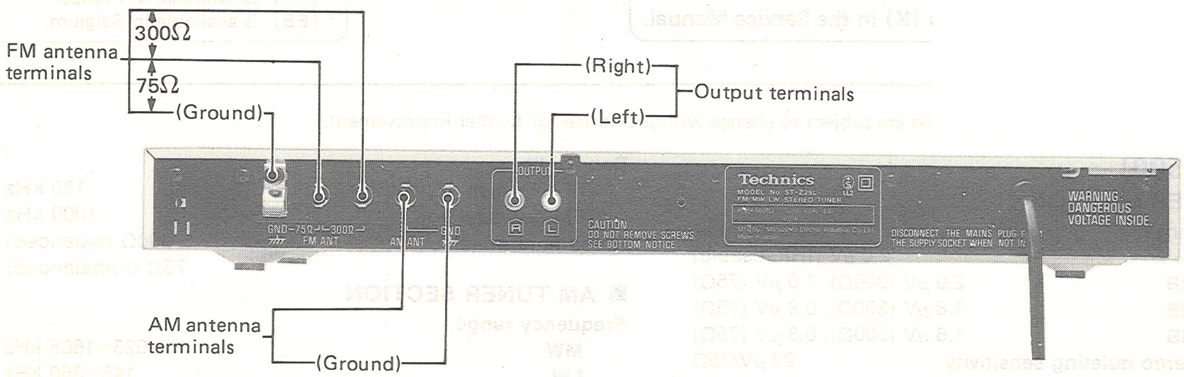
■ LOCATION OF CONTROLS



(■ MW. ▬ LW)
(■ FM. ▬ AM)
Band selector
FM/AM tuning/signal indicators
FM muting/FM mode selector
(■ on/FM auto, ▬ off/FM mono)
FM stereo indicator
Tuning control
Technics
FM/MW/LW Stereo Tuner ST-Z25L
power stand by
FM 88 90 92 94 96 98 100 102 104 106 108 MHz
MW 530 550 600 650 700 750 800 900 1000 1100 1200 1300 1400 1500 1600 kHz
LW 145 160 170 270 290 310 330 350 kHz
FM stereo
tune & signal
selector
FM muting/mode
tuning
Power

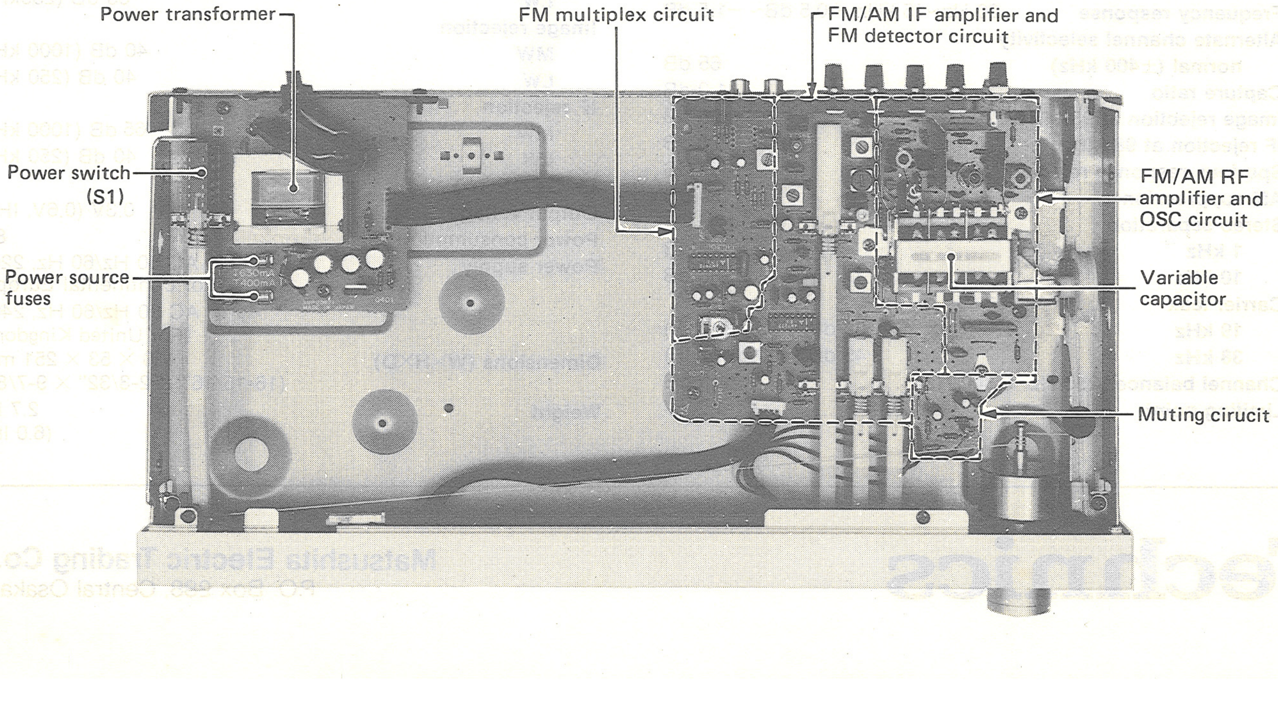


300Ω
FM antenna terminals
75Ω
(Ground)
(Right)
Output terminals
(Left)
GND—75Ω—300Ω
FM ANT
AM ANT
GND
OUTPUT
R
L
CAUTION: DO NOT REMOVE SCREWS. SEE BOTTOM NOTICE
Technics
MODEL No. ST-Z25L
FM/MW/LW STEREO TUNER
DISCONNECT THE MAINS PLUG FROM THE SUPPLY SOCKET WHEN NOT IN USE
WARNING: DANGEROUS VOLTAGE INSIDE.
AM antenna terminals
(Ground)

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different.

* 220V (50/60 Hz) for continental Europe.

* 240V (50/60 Hz) for United Kingdom.

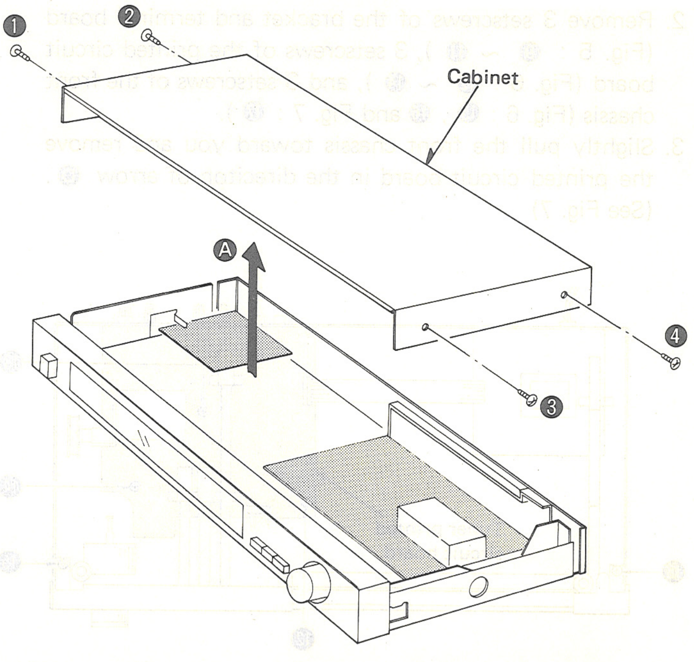


Power transformer
FM multiplex circuit
FM/AM IF amplifier and FM detector circuit
Power switch (S1)
FM/AM RF amplifier and OSC circuit
Power source fuses
Variable capacitor
Muting ciruict

■ DISASSEMBLY INSTRUCTIONS

• How to remove the cabinet

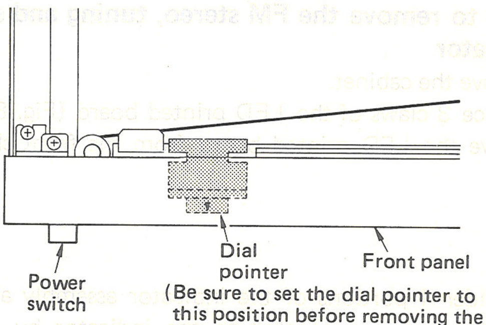
1. Remove the 4 setscrews (Fig. 1 : ❶ ~ ❹) on the cabinet.
2. Move the cabinet in the direction of the arrow Ⓐ in Fig. 1.


❶
❷
Cabinet
Ⓐ
❸
❹

[Fig. 1]

• How to remove the front panel

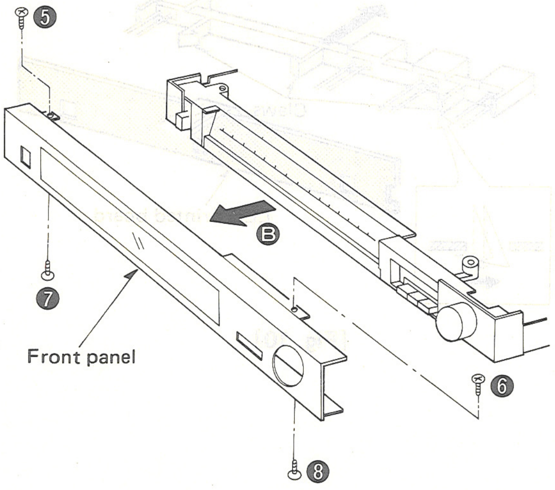
1. Remove the cabinet and set the dial pointer to the position as in Fig. 2. (Removing the front panel without setting the dial pointer to the position may cause damage to the dial pointer.)


Power switch
Dial pointer
Front panel

(Be sure to set the dial pointer to this position before removing the front panel.)

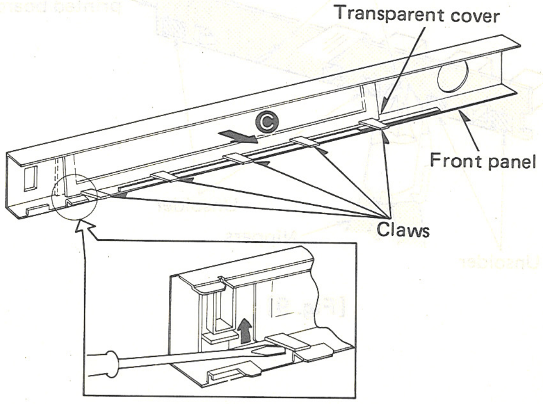
[Fig. 2]

2. Remove 4 setscrews of the front panel (Fig. 3 : ❺ ~ ❽) and remove the front panel in the direction of arrow Ⓑ.


❺
Ⓑ
❼
Front panel
❻
❽

[Fig. 3]

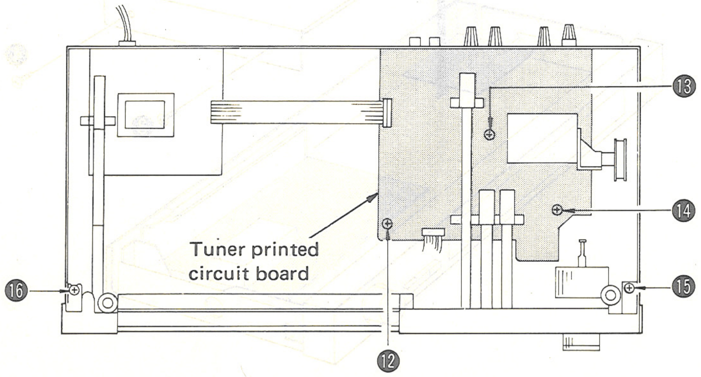
3. When removing the transparent cover, release the 5 claws with a screwdriver (See Fig. 4), and remove the transparent cover in the direciton of arrow Ⓒ.


Transparent cover
Ⓒ
Front panel
Claws

[Fig. 4]

• How to remove the tuner printed circuit board

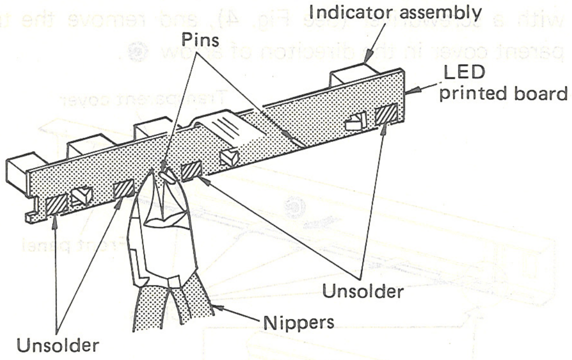
1. Remove the cabinet and front panel.
2. Remove 3 setscrews of the bracket and terminal board (Fig. 5 : ⑨ ~ ⑪), 3 setscrews of the printed circuit board (Fig. 6 : ⑫ ~ ⑭), and 3 setscrews of the front chassis (Fig. 6 : ⑮ , ⑯ and Fig. 7 : ⑰).
3. Slightly pull the front chassis toward you and remove the printed circuit board in the direciton of arrow Ⓓ. (See Fig. 7)


⑬
⑭
Tuner printed circuit board
⑯
⑮
⑫

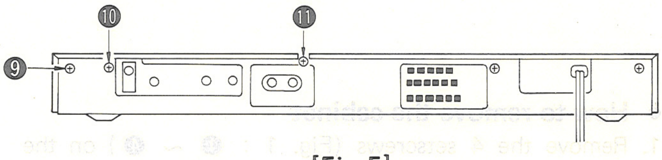
[Fig. 6]

• How to remove the FM stereo, tuning and signal indicator

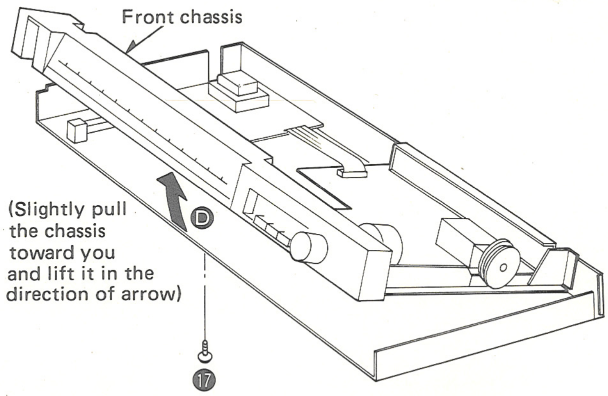
1. Remove the cabinet.
2. Replace 3 claws of the LED printed board (Fig. 8) and remove the LED printed board from the front chassis.
3. Unsolder 4 portions of the indicator assembly and cut off the 2 pins connected to the indicator by use of nippers. (See Fig. 9)


Indicator assembly
Pins
LED printed board
Unsolder
Nippers
Unsolder

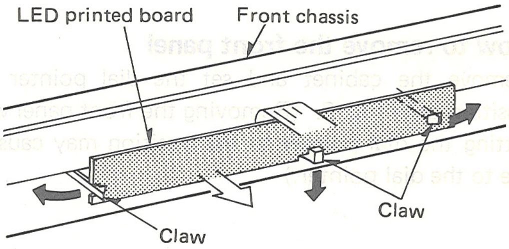
[Fig. 9]



[Fig. 5]

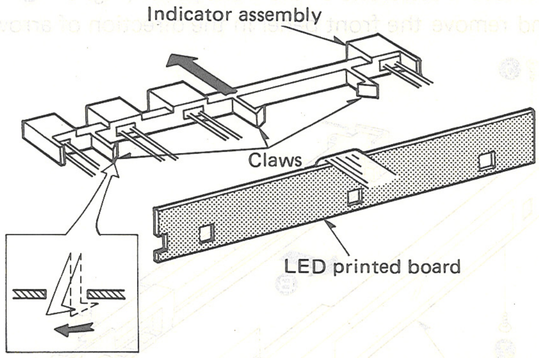

Front chassis
(Slightly pull the chassis toward you and lift it in the direction of arrow)
Ⓓ
⑰

[Fig. 7]


LED printed board
Front chassis
Claw
Claw

[Fig. 8]

4. Release 3 claws of the indicator assembly and remove the indicator from the LED printed board. (Fig. 10)

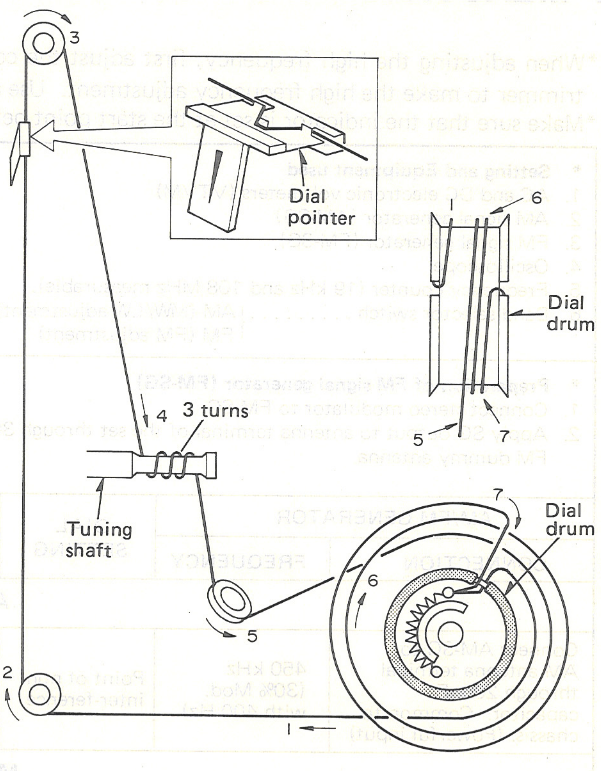

Indicator assembly
Claws
LED printed board

[Fig. 10]

■ DIAL CORD INSTALLATION GUIDE

For threading a fresh cord, proceed as follows.

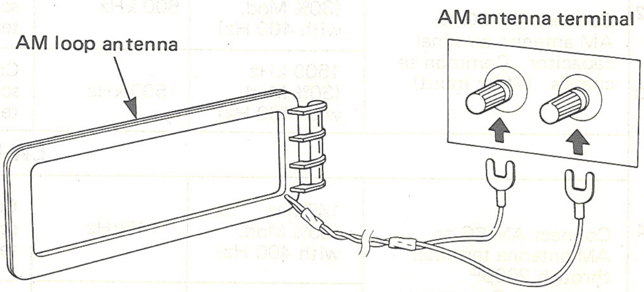
1. Prepare a fresh cord more than 180 cm (70-15/16") in length.
2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor).
3. Direct the cord in the order from 1 to 7.
4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
5. Fix the knot of the cord with the board.


3
Dial pointer
1
6
Dial drum
4
3 turns
Tuning shaft
5
7
7
Dial drum
6
5
2
1

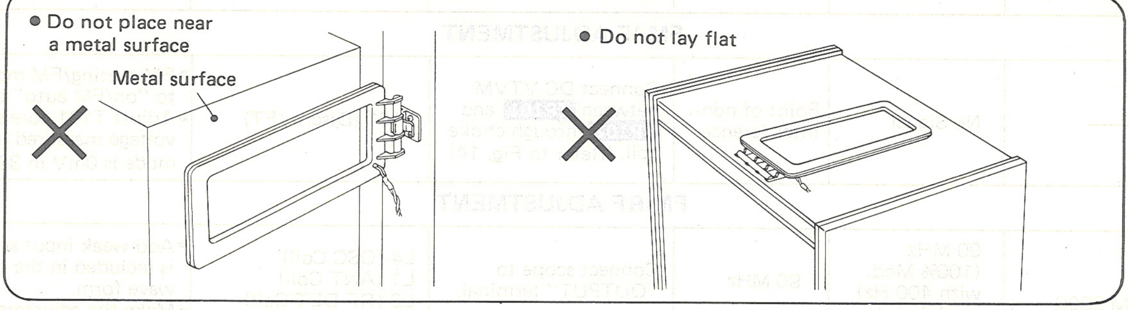
[Fig. 11]

■ AM LOOP ANTENNA

Since the unit does not employ the conventional AM bar antenna, be sure to connect the AM loop antenna to the AM antenna terminal on the back of the set when receiving AM antenna terminal. When the AM loop antenna is connected to the rear panel, place it as far away from the set as possible to improve the sensitivity.


AM antenna terminal
AM loop antenna

Precautions for attachment


● Do not place near a metal surface
Metal surface
● Do not lay flat

■ BEFORE STARTING THE REPAIRING

The power switch of this unit is connected to the secondary side of the power transformer, Be sure to pull the power cord out of the socket before repair.

■ MEASUREMENTS AND ADJUSTMENTS

*When adjusting the high frequency, first adjust the coil (lower frequency adjustment) and then gradually tighten the loose trimmer to make the high frequency adjustment. Use a non-metallic screwdriver when adjusting the OSC coil and IFT.

*Make sure that the indicator is set at the start point before the adjustment. (See Fig. 12)

*** Setting and Equipment used**

1. AC and DC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. FM signal generator (FM-SG)
4. Oscilloscope
5. Frequency counter (19 kHz and 108 MHz measurable).
6. Band selector switch .... AM (MW/LW adjustment)
   FM (FM adjustment)
7. FM muting/FM mode switch ..... off/FM mono
8. Maintain line voltage at rated voltage.
9. 300Ω FM dummy antenna ....Refer to Fig. 13
10. Output of signal generator should be no higher than necessary to obtain an output reading.

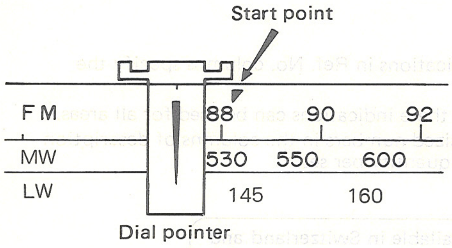
*** Preparation of FM signal generator (FM-SG)**

1. Connect stereo modulator to FM-SG.
2. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.
3. The standard input of the set is 60 dB (1mV), 400 Hz, 100% modulation (Because of using dummy antenna, SG output must be 12 dB plus (IHF). That is, when input is 60 dB, SG output is to be 72 dB)

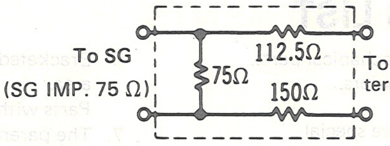
Step No.	AM/FM GENERATOR		DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT POINTS	REMARKS
	CONNECTION	FREQUENCY				
	AM-IF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Powerful input)	450 kHz (30% Mod. with 400 Hz)	Point of non-inter-ference	Connect AC VTVM or scope to "OUTPUT" terminals.	T201 (AM IFT)	• Adjust the input frequency and adjustment points so that the output becomes maximum.
	MW -RF ADJUSTMENT *Set band selector to "MW" position.					
2	Connect AM-SG to AM antenna terminal capacitor. Common to chassis. (Weak input)	600 kHz (30% Mod. with 400 Hz)	600 kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	L203 (MW OSC Coil) L202 (MW ANT Coil)	• Adjust for maximum output.
3		1500 kHz (30% Mod. with 400 Hz)	1500 kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	CT201 (MW OSC Trimmer)	• Adjust for maximum output. • Repeat steps (2) and (3).
	LW-RF ADJUSTMENT * Set band selector to "LW" position.					
4	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	145kHz (30% Mod. with 400 Hz)	145kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	L252 (LW OSC Coil) L251 (LW ANT Coil)	• Adjust for maximum output.
5		350kHz (30% Mod. with 400 Hz)	350kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	CT251 (LW OSC Trimmer)	• Adjust for maximum output. • Repeat steps (4) and (5).
	FM-IF ADJUSTMENT					
6	———	No Signal	Point of non-inter-ference	Connect DC VTVM between TP101 and TP102 through choke coil. (Refer to Fig. 14)	T101 (Discri. IFT)	• FM muting/FM mode switch to "on/FM auto" position. • Adjust T101 core so that voltage measured in signal mode is 0mV in 300mV range.
	FM-RF ADJUSTMENT					
7	Connect to FM 300Ω antenna terminal through 300Ω FM dummy antenna.	90 MHz (100% Mod. with 400 Hz) weak input	90 MHz	Connect scope to "OUTPUT" terminal.	L4 (OSC Coil) L1 (ANT Coil) L2 (RF DET Coil)	• Add weak input so that noise is included in the output wave form. • Make the adjustment so that the output wave form is vertically symmetrical. (Fig. 15) • Repeat the steps (7) and (8) until the frequency correctly matches the dial scale.
8		106 MHz (100% Mod. with 400 Hz) weak input.	106 MHz	Connect scope to "OUTPUT" terminal.	CT1 (OSC Trimmer)	

FM MPX V.C.O. ADJUSTMENT

Step No.	USING A FREQUENCY COUNTER	USING ALTERNATE SYSTEM
9	1. 100 MHz 60 dB Non-modulated mono signal applied to set. 2. FM muting/FM mode switch to "on/FM auto". 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust TP301 to 19 kHz ± 30 Hz.	1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in fig. 16.

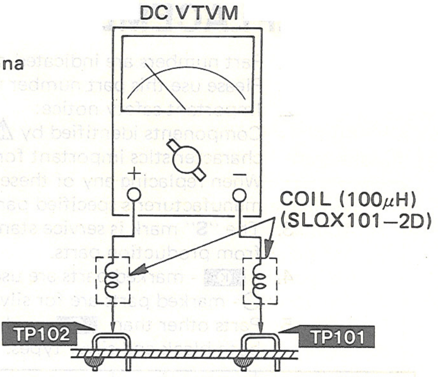

Start point
FM
88
90
92
MW
530
550
600
LW
145
160
Dial pointer

[Fig. 12]

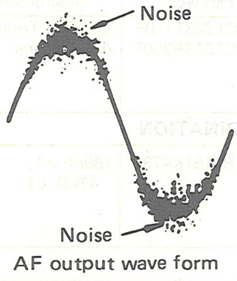

To SG
(SG IMP. 75 Ω)
75Ω
112.5Ω
150Ω
To FM antenna
terminal

300Ω FM dummy Antenna

[Fig. 13]

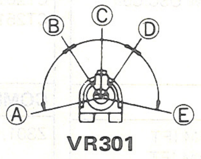

DC VTVM
+
−
COIL (100μH)
(SLQX101−2D)
TP102
TP101

[Fig. 14]



AF output wave form

[Fig. 15]



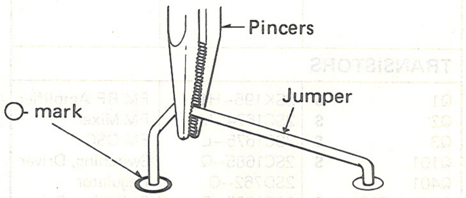
A – B, D – E Stereo OFF Position.

B – D Stereo ON Position. (indicator Lighting)

C Adjust Point of Pilot Circuit

[Fig. 16]

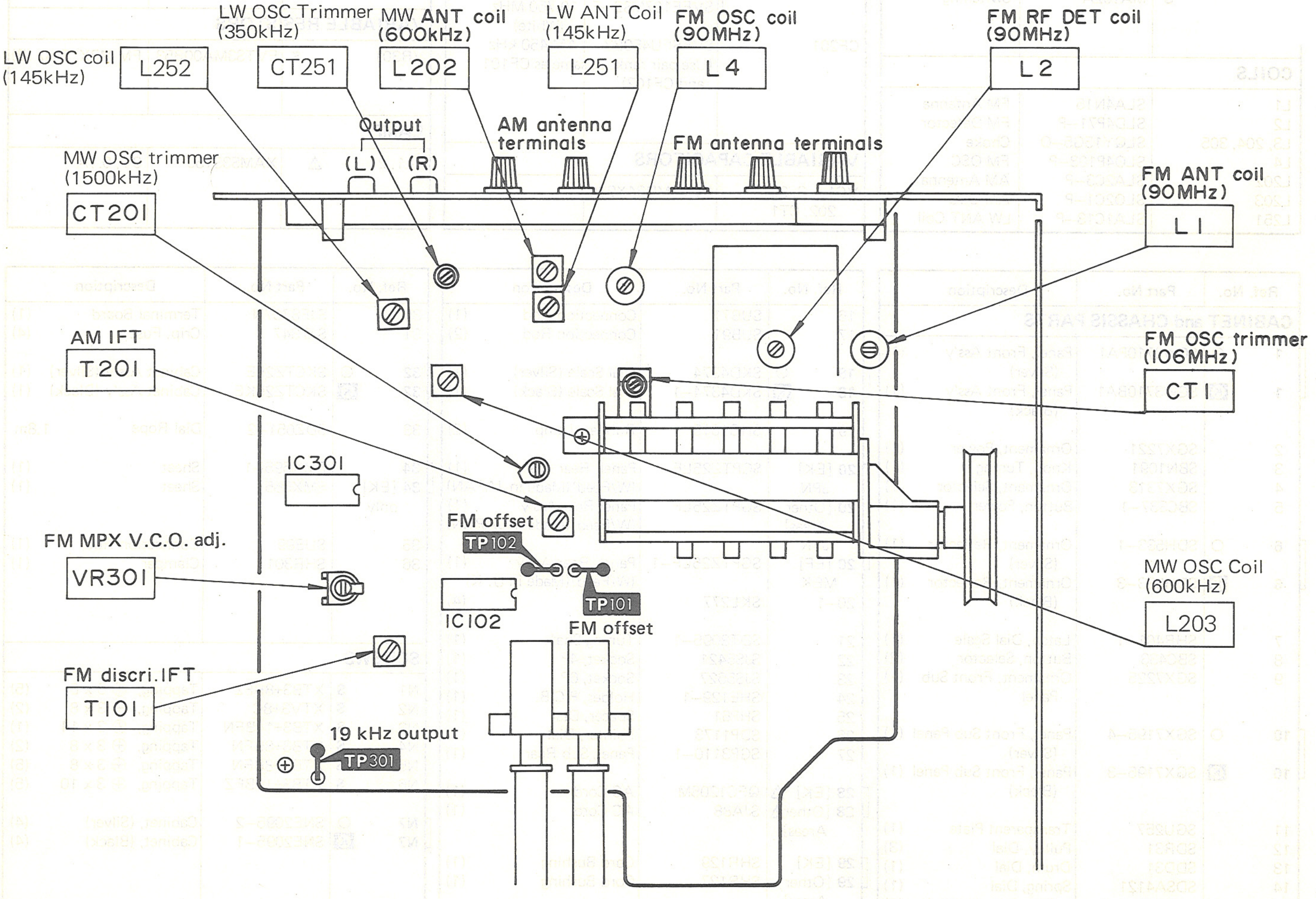
- **About test point**


Pincers
Jumper
○- mark

It can be removed by pulling the ○ - marked side by use of pincers. Insert it into the original hole when not needed.

[Fig. 17]

- **Adjustment points**


LW OSC coil
(145kHz)
L252
LW OSC Trimmer
(350kHz)
CT251
MW ANT coil
(600kHz)
L202
LW ANT Coil
(145kHz)
L251
FM OSC coil
(90MHz)
L4
FM RF DET coil
(90MHz)
L2
Output
(L)
(R)
AM antenna
terminals
FM antenna terminals
MW OSC trimmer
(1500kHz)
CT201
FM ANT coil
(90MHz)
L1
AM IFT
T201
FM OSC trimmer
(106MHz)
CT1
IC301
FM offset
TP102
TP101
FM offset
FM MPX V.C.O. adj.
VR301
IC102
MW OSC Coil
(600kHz)
L203
FM discri.IFT
T101
19 kHz output
TP301

■ REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The **"S"** mark is service standard parts and may differ from production parts.
4. Ⓚ - marked parts are used for black only, while ○- marked parts are for silver type only.
5. Parts other than Ⓚ- and ○- marked are used for both black and silver types.
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
7. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

- * [EX] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [EF] is available in France.
- * [EB] is available in Belgium.

INTEGRATED CIRCUITS

Ref. No.	Part No.	Description
IC101	AN278	AM IF Amplifier
IC102	AN7273	FM/AM Detector
IC301	SVIUPC1161C3	FM MPX

TRANSISTORS

Ref. No.	Part No.	Description
Q1 S	2SK195–H1	FM RF Amplifier
Q2 S	2SC1674–M	FM Mixer
Q3 S	2SC1675–L	FM OSC
Q101 S	2SC1685–Q	Switching, Driver
Q401	2SD762–O	Regulator
Q501 ~ 503 S	2SC1685–Q	Switching, Driver

DIODES

Ref. No.	Part No.	Description
D101	MA27W–A	Detector
D302 S	MA162A	Switching
D401, 402 ⚠ S	SVDSR1K2	Rectifier
D403	SVDMZ312C	12V, Zener
D504 S	MA162A	Switching

COILS

Ref. No.	Part No.	Description
L1	SLA4N15	FM Antenna
L2	SLD4P71–P	FM Detector
L3, 204, 305	SLQY15G5–O	Choke
L4	SLO4P103–P	FM OSC
L202	SLA2C3–P	AM Antenna
L203	SLO2C1–P	AM OSC
L251	SLA1C13–P	LW ANT Coil
L252	SLO1C13–P	LW OSC Coil

TRANSFORMERS

Ref. No.	Part No.	Description
T101	SLI4C539–P	FM IFT
T201	SLI2C139–M	AM IFT
T401 [EK] ⚠	SLT5K125	Power Source
T401 [Other Areas] ⚠	SLT5K123	Power Source

CERAMIC FILTERS

Ref. No.	Part No.	Description
CF101, 102	SVFE107MS2–A	10.700 MHz (Red)
	SVFE107MS2–B	10.675 MHz (Blue)
	SVFE107MS2–C	10.725 MHz (Orange)
	SVFE107MS2–D	10.650 MHz (Black)
	SVFE107MS2–E	10.750 MHz (White)
CF201	SVFSFU450B3 (Use pair ranks as same as CF101 and CF102)	AM 450 kHz

VARIABLE CAPACITORS

Ref. No.	Part No.	Description
VC1 ~ 3, 201 202, CT1	ECV5MD34X93G	
CT201	SVCTZ03T110F	MW OSC Trimmer
CT251	SVCTZ03R200F	AM Antenna

COMPONENT COMBINATION

Ref. No.	Part No.	Description
Z301, 302	EXRP181K473C	180pF x 1, 47kΩ x 1

SWITCHES

Ref. No.	Part No.	Description
S1	SSH2031	Muting
S2	SSH1051	Selector
S3 ⚠	SSH1043	Power Source

FUSES

Ref. No.	Part No.	Description
F1 ⚠	XBA2C04TR0	250V, 400mA
F2 ⚠	XBA2C03TR0	250V, 300mA

VARIABLE RESISTORS

Ref. No.	Part No.	Description
VR301 S	EVTS3MA00B53	FM MPX, 5kΩ (B)

LAMP

Ref. No.	Part No.	Description
PL1, 2 ⚠	XAMS3S150	8V, 0.1A

CABINET and CHASSIS PARTS

Ref. No.	Part No.	Description
1 ○	SGW3710PA1	Panel, Front Ass'y (Silver) (1)
1 Ⓚ	SGW3710BA1	Panel, Front Ass'y (Black) (1)
2	SGX7221	Ornament, Power (1)
3	SBN1091	Knob, Tuning (1)
4	SGX7313	Ornament, Selector (1)
5	SBC337–1	Button, Power (1)
6 ○	SDH533–1	Ornament, Reflector (Silver) (1)
6 Ⓚ	SDH533–3	Ornament, Reflector (Black) (1)
7	SHR401–1	Latch, Dial Scale (1)
8	SBC433	Button, Selector (2)
9	SGX7225	Ornament, Front Sub Panel (1)
10 ○	SGX7195–4	Panel, Front Sub Panel (Silver) (1)
10 Ⓚ	SGX7195–3	Panel, Front Sub Panel (Black) (1)
11	SGU257	Transparent Plate (1)
12	SDR31	Pulley, Dial (3)
13	SDD31	Drum, Dial (1)
14	SDSA4121	Spring, Dial (1)
15	LN04181P–1	L.E.D. (with Holder) (1)
16	SUB71	Connection Rod (1)
17	SUB91	Connection Rod (2)
18 ○	SKD4374	Dial Scale (Silver) (1)
18 Ⓚ	SKD4374–1	Dial Scale (Black) (1)
19	SHG1615	Rubber, Lamp (2)
20 [EK] JPN	SGPTZ25LE	Panel, Rear Ass'y (W/Feed) (Made in JAPAN) (1)
20 [Other Areas] JPN	SGPTZ25LF	Panel Rear Ass'y (W/Feed) (Made in JAPAN) (1)
20 [EF] MEK	SGPTZ25LF–1	Panel, Rear Ass'y (W/Feed) (Made in U. K) (1)
20–1	SKL277	Foot (4)
21	SDT8095–1	Tuning Shaft (1)
22	SJS5421	Socket, 4P (1)
23	SJS5627	Socket, 6P (1)
24	SHE129–1	Holder, P.C.B. (1)
25	SHP61	Spacer, Dial (1)
26	SDP1173	Pointer, Dial (1)
27	SGP3110–1	Panel, Sub Rear (1)
28 [EK] ⚠	QFC1205M	AC Cord (1)
28 [Other ⚠ Areas]	SJA88	AC Cord (1)
29 [EK]	SHR129	Cord Bushing (1)
29 [Other Areas]	SHR127	Cord Bushing (1)
30	SJF8707N	Terminal Board (1)
31	SJT347	Crip, Fuse (4)
32 ○	SKCTZ25E	Cabinet Ass'y (Silver) (1)
32 Ⓚ	SKCTZ25KE	Cabinet Ass'y (Black) (1)
33	SDZ051–2	Dial Rope 1.8m
34	SMX595–1	Sheet (1)
34 [EK] only	SMX555	Sheet (1)
35	SUB99	Connection Rod (1)
36	SHR301	Clamper (1)

SCREWS

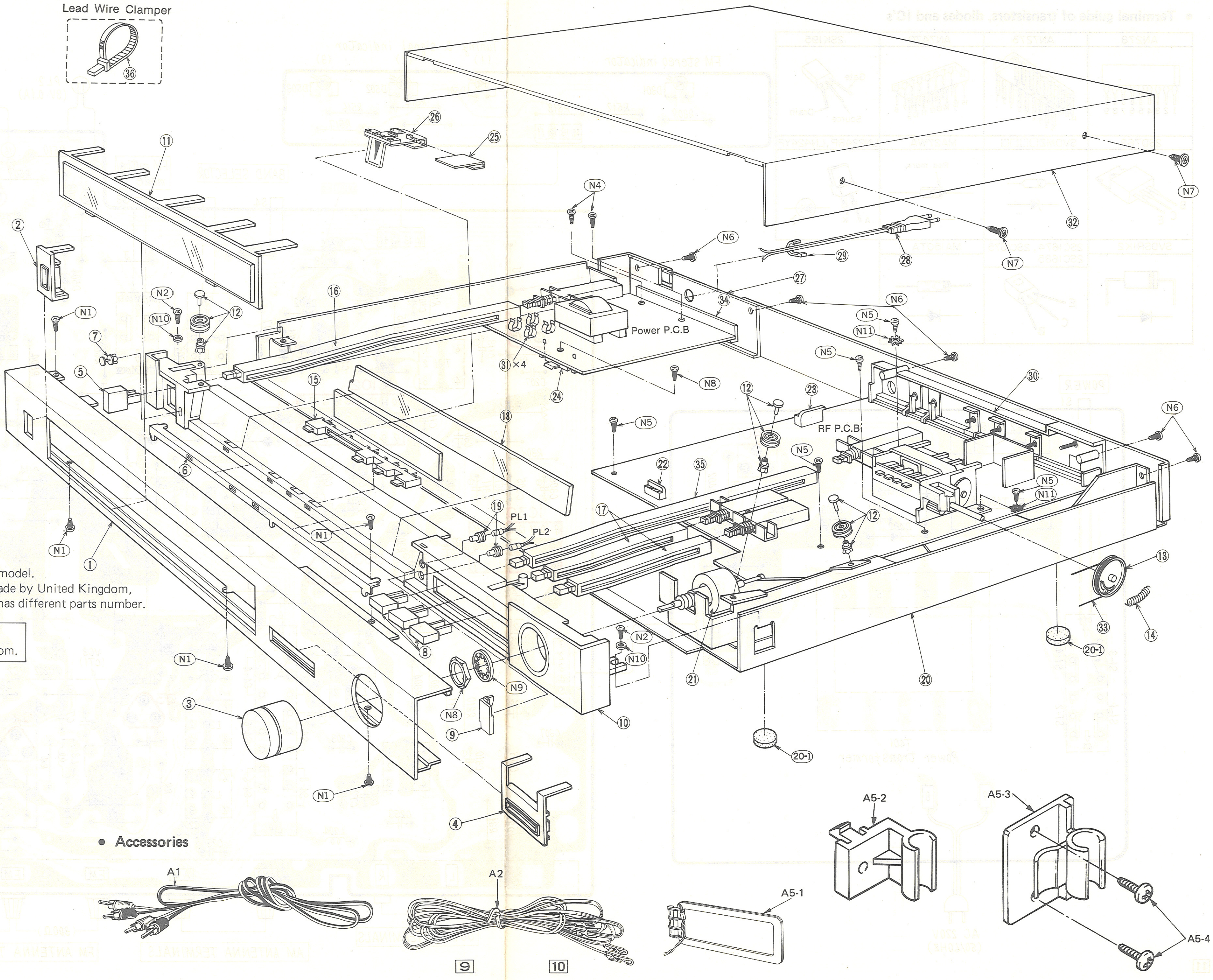
Ref. No.	Part No.	Description
N1 S	XTB3+8BFZ	Tapping, ⊕ 3 x 8 (5)
N2 S	XTV3+8C	Tapping, ⊕ 3 x 8 (2)
N3 S	XTB3+14BFN	Tapping, ⊕ 3 x 14 (1)
N4 S	XTB3+8BFN	Tapping, ⊕ 3 x 8 (2)
N5 S	XTB3+8BFN	Tapping, ⊕ 3 x 8 (5)
N6 S	XTB3+10BFZ	Tapping, ⊕ 3 x 10 (5)
N7 ○	SNE2095–2	Cabinet, (Silver) (4)
N7 Ⓚ	SNE2095–1	Cabinet, (Black) (4)

Ref. No.	Part No.	Description
NUTS		
N8 **S**	XNS11	Tuning Shaft, ϕ11 (1)
N9 **S**	XWD11B	Tuning Shaft, ϕ11 (1)
WASHERS		
N10 **S**	XWG3	Plain, ϕ3 (2)
N11 **S**	XWC3B	Extarnal Toothed Lock, ϕ (2)
ACCESSORIES		
A1	SJP2249	Cord (1)
A2	SSA267	Antenna (1)
A3 [EX, EB]	SQF11175	Instructions Book (1)
A3 [EK]	SQF11295	Instructions Book (1)
A4 [EF]	SQF11297	Instructions Book (1)
A5	SPB869−1	Loop Antenna Ass'y (1)
A5−1	SSA605−1	Antenna (1)
A5−2	SMA231	Holder (1)
A5−3	SMA233	Holder (1)
A5−4	XTN3+10AFZ	Screw (2)
PACKING PARTS		
P1 [EK]JPN	SPG3825	Carton Box (Silver) (Made in JAPAN) (1)
P1 [EX, EB] JPN ○	SPG3827	Carton Box (Silver) (Made in JAPAN) (1)
P1 JPN Ⓚ	SPG3911	Carton Box (Black) (Made in JAPAN) (1)
P1 [EF]JPN	SPG3829	Carton Box (Silver) (Made in JAPAN) (1)
P1 [EF] MEK	SPG3831	Carton Box (Silver) (Made in MELUK) (1)
P2	SPS3493	Pad, Front (1)
P3	SPS3495	Pad, Rear (1)
P4 ○	SPP697	Polyethylene Bag (Silver) (1)
P4 Ⓚ	SPP647	Polyethylene Bag (Black) (1)

* We have a two production country for this model.
One of a made by Japan and other one is made by United Kingdom,
The made by United Kingdom unit was we has different parts number.

JPN : Made in JAPAN.
MEK : Made in United Kingdom.

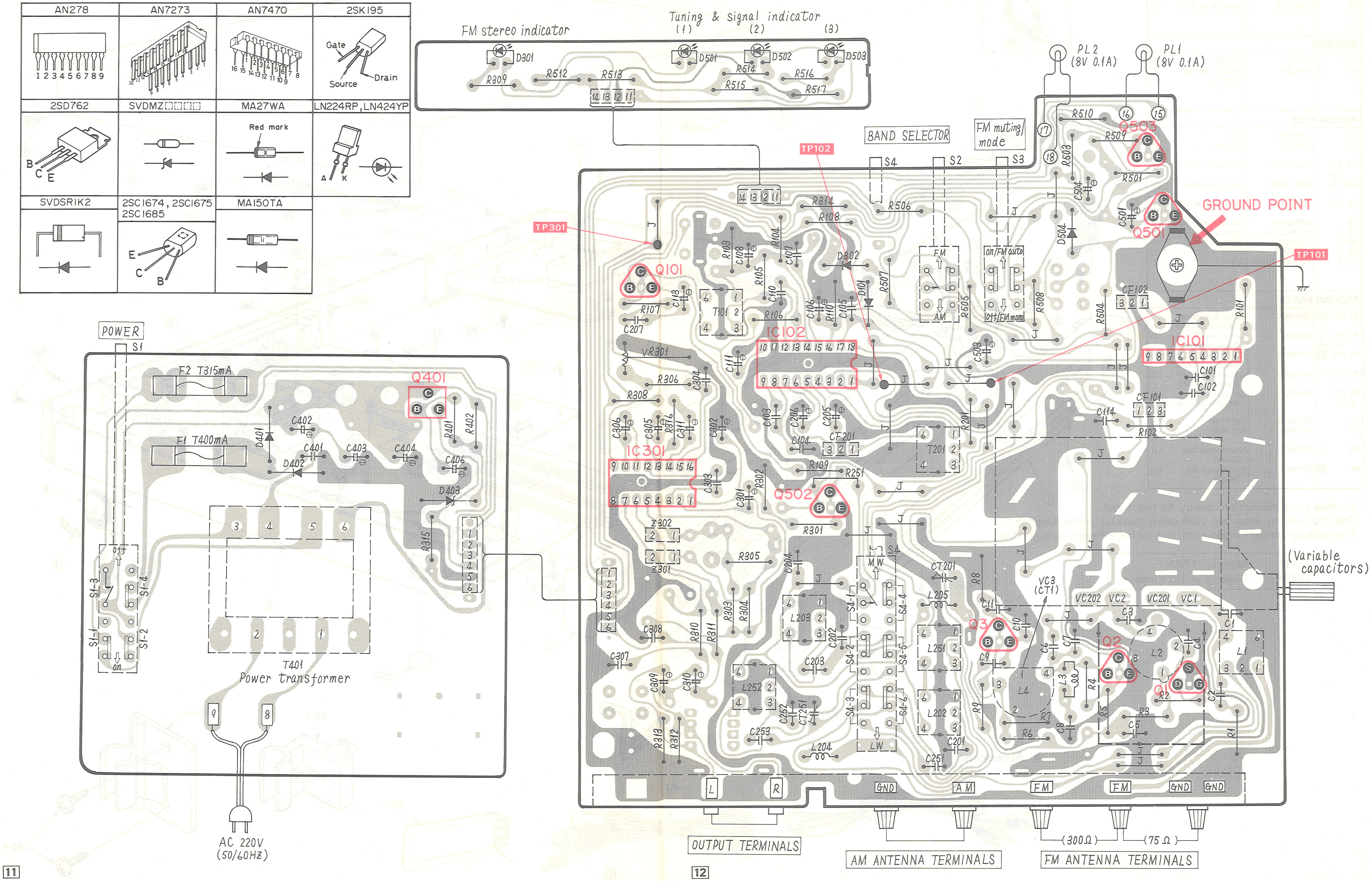
EXPLODED VIEWS

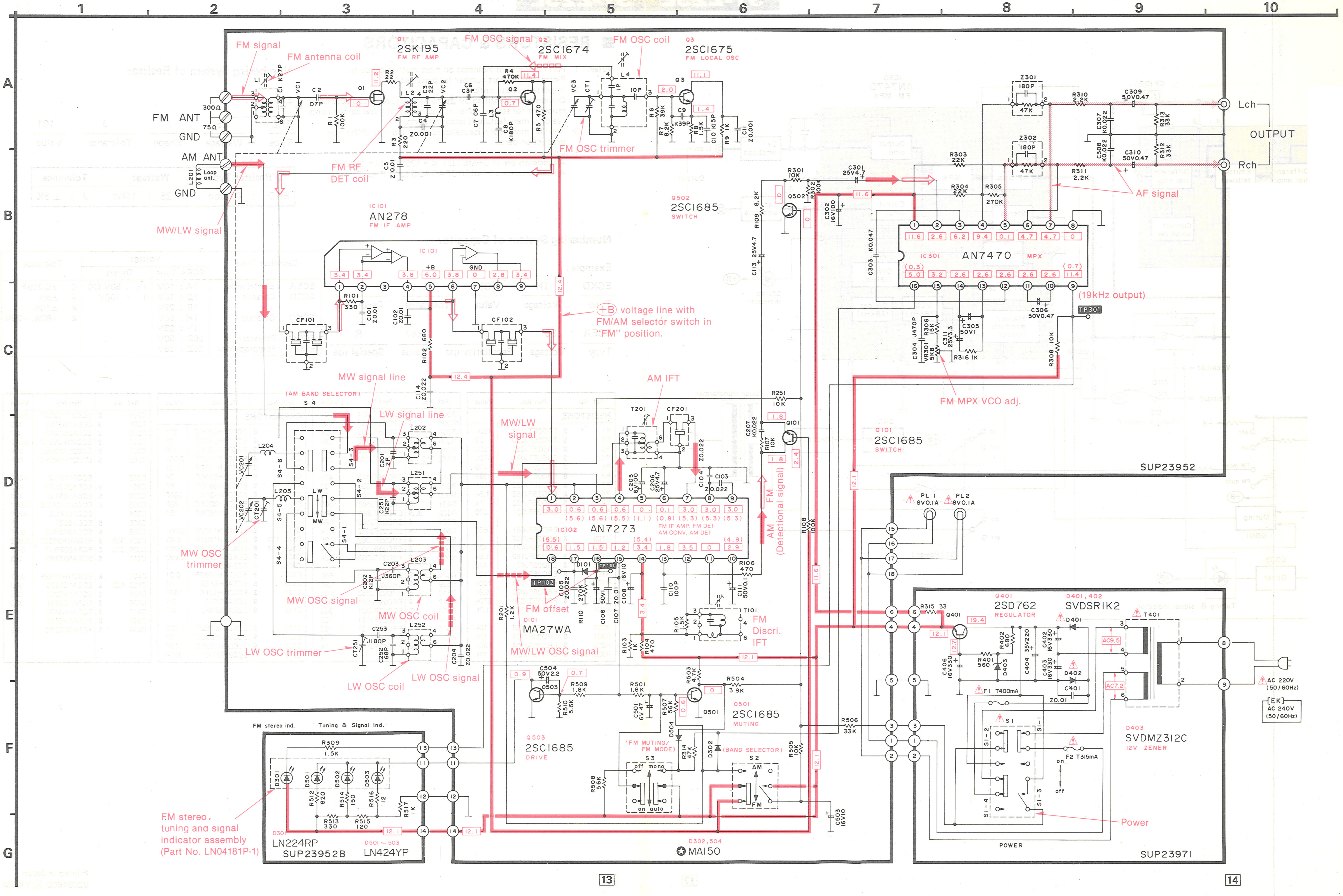

Lead Wire Clamper
36
1
2
3
3 ×4
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
20-1
21
22
23
24
25
26
27
28
29
30
32
33
34
35
N1
N2
N4
N5
N6
N7
N8
N9
N10
N11
PL1
PL2
Power P.C.B
RF P.C.B
Accessories
A1
A2
A5-1
A5-2
A5-3
A5-4

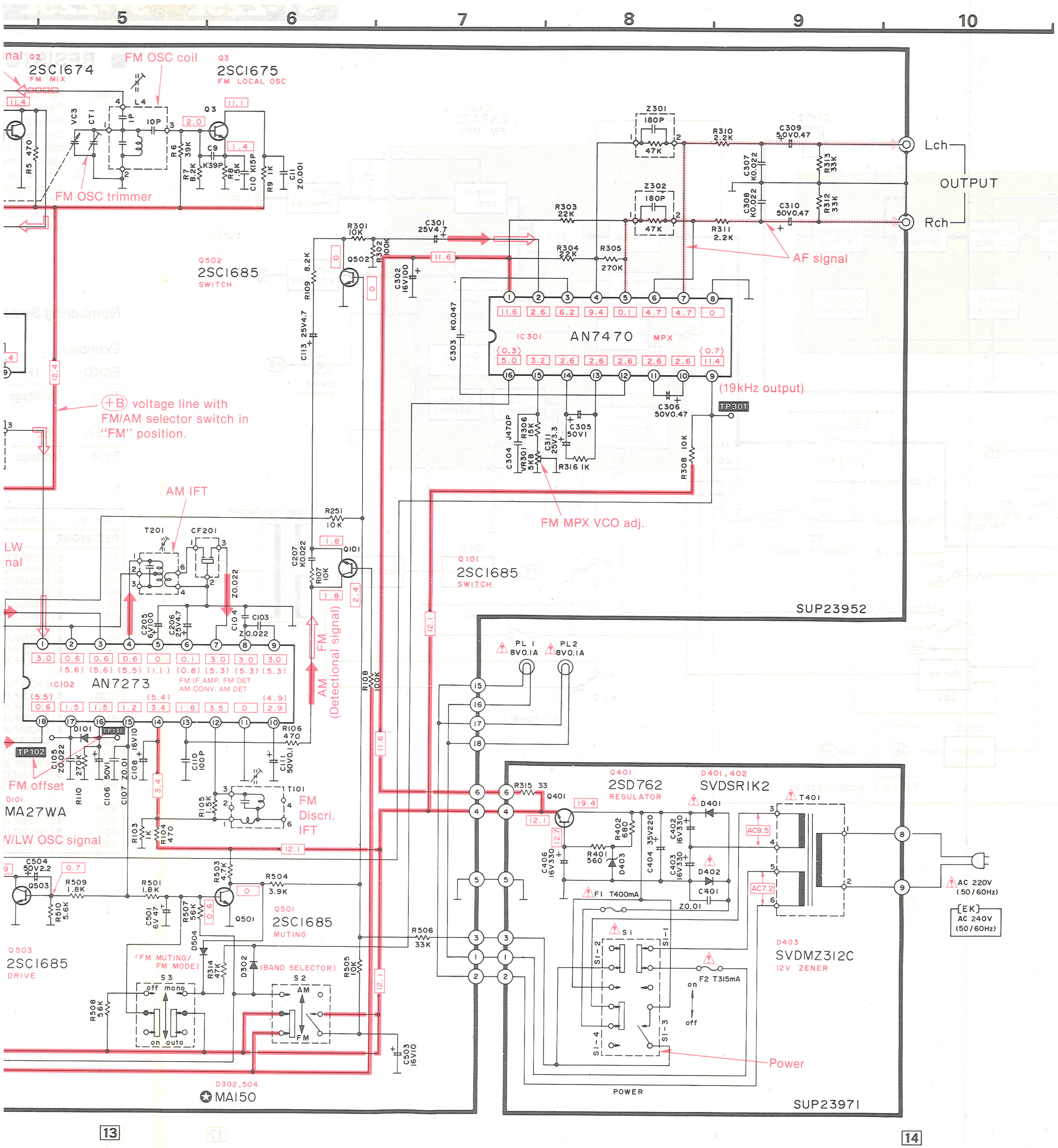
CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

▨ Ground (Earth) lines

- Terminal guide of transistors, diodes and IC's


AN278
1 2 3 4 5 6 7 8 9
AN7273
AN7470
2SK195
Gate
Source
Drain
2SD762
B
C
E
SVDMZ□□□□□
MA27WA
Red mark
LN224RP, LN424YP
A
K
SVDSR1K2
2SC1674, 2SC1675
2SC1685
E
C
B
MA150TA
FM stereo indicator
Tuning & signal indicator
(1)
(2)
(3)
D301
D501
D502
D503
R309
R512
R513
R514
R515
R516
R517
14 13 12 11
PL2 (8V 0.1A)
PL1 (8V 0.1A)
BAND SELECTOR
FM muting/mode
S4
S2
S3
TP102
TP301
TP101
GROUND POINT
Q101
Q501
Q502
Q503
Q401
Q1
Q2
Q3
IC101
IC102
IC301
T101
T201
FM
AM
on/FM auto
off/FM mono
CF101
CF102
CF201
VR301
Z301
Z302
MW
LW
L201
L202
L203
L204
L205
L251
L252
L1
L2
L3
L4
VC3 (CT1)
VC202
VC2
VC201
VC1
(Variable capacitors)
POWER
S1
off
on
S1-1
S1-2
S1-3
S1-4
F1 T400mA
F2 T315mA
D401
D402
D403
C401
C402
C403
C404
C406
R401
R402
R315
T401
Power transformer
AC 220V (50/60Hz)
L
R
GND
AM
FM
OUTPUT TERMINALS
AM ANTENNA TERMINALS
(300Ω)
(75Ω)
FM ANTENNA TERMINALS


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
FM signal
FM antenna coil
Q1 2SK195 FM RF AMP
FM OSC signal
Q2 2SC1674 FM MIX
FM OSC coil
Q3 2SC1675 FM LOCAL OSC
FM ANT 300Ω 75Ω
GND
AM ANT
Loop ant.
GND
FM RF DET coil
FM OSC trimmer
MW/LW signal
IC101 AN278 FM IF AMP
CF101
CF102
Q502 2SC1685 SWITCH
(+B) voltage line with FM/AM selector switch in "FM" position.
Z301
Z302
C309 50V0.47
C310 50V0.47
OUTPUT
Lch
Rch
AF signal
IC301 AN7470 MPX
(19kHz output)
TP301
FM MPX VCO adj.
MW signal line
(AM BAND SELECTOR) S4
LW signal line
AM IFT
T201
CF201
Q101 2SC1685 SWITCH
MW/LW signal
IC102 AN7273 FM IF AMP, FM DET AM CONV, AM DET
AM (Detectional signal)
FM
SUP23952
MW OSC trimmer
MW OSC signal
MW OSC coil
LW OSC trimmer
LW OSC coil
LW OSC signal
TP102
FM offset
D101 MA27WA
MW/LW OSC signal
T101 FM Discri. IFT
PL1 8V0.1A
PL2 8V0.1A
Q401 2SD762 REGULATOR
D401,402 SVDSR1K2
T401
F1 T400mA
F2 T315mA
AC 220V (50/60Hz)
[EK] AC 240V (50/60Hz)
D403 SVDMZ312C 12V ZENER
S1
POWER
Power
SUP23971
Q503 2SC1685 DRIVE
Q501 2SC1685 MUTING
(FM MUTING/ FM MODE) S3 off mono on auto
(BAND SELECTOR) S2 AM FM
FM stereo ind.
Tuning & Signal ind.
FM stereo, tuning and signal indicator assembly (Part No. LN04181P-1)
D301 LN224RP
D501~503 LN424YP
SUP23952B
D302,504 MA150


5
6
7
8
9
10
FM OSC coil
2SC1674
FM MIX
2SC1675
FM LOCAL OSC
FM OSC trimmer
Lch
OUTPUT
Rch
AF signal
Q502
2SC1685
SWITCH
IC301
AN7470
MPX
(19kHz output)
TP301
FM MPX VCO adj.
(+B) voltage line with FM/AM selector switch in "FM" position.
AM IFT
T201
CF201
Q101
2SC1685
SWITCH
SUP23952
IC102
AN7273
FM IF AMP, FM DET
AM CONV, AM DET
FM
AM
(Detectional signal)
TP102
FM offset
D101
MA27WA
LW/LW OSC signal
T101
FM Discri. IFT
PL1 8V0.1A
PL2 8V0.1A
Q401
2SD762
REGULATOR
D401, 402
SVDSR1K2
T401
AC 220V (50/60Hz)
EK
AC 240V (50/60Hz)
F1 T400mA
F2 T315mA
D403
SVDMZ312C
12V ZENER
Q503
2SC1685
DRIVE
Q501
2SC1685
MUTING
(FM MUTING/FM MODE)
S3
(BAND SELECTOR)
S2
Power
POWER
D302, 504
MA150
SUP23971

SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

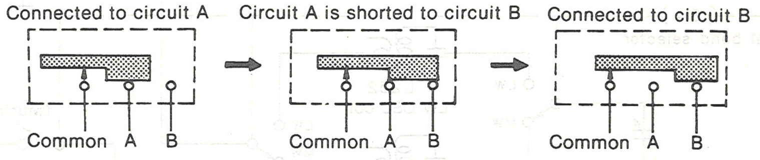
* The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. without ✪- mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.

1. **S1** : Power source switch in "**on**" position.
2. **S2** : Band selector switch in "**FM**" position
   FM◄─►AM
3. **S3** : FM muting/FM mode selector switch in "**on/FM auto**" position.
   on/FM auto◄─►off/FM mono
4. **S4** : AM band selector switch in "**MW**" position.
   MW◄─►LW
5. Indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the chassis taken values, depending on the internal impedance of the DC circuit tester.
   - * Figures in ☐ stand for DC voltage in FM/AM signal reception mode.
   - * Figures in 〈 〉 stand for DC voltage in FM stereo signal reception mode.
   - * Figures in ( ) stand for DC voltage with the band selectors circuit set at AM.
6. Signal lines
   ⇨/▭▭▭⇨ FM signal　━━ Positive (+B) voltage line
   ⇛ Audio frequency signal　➡/■■■➡ AM signal
7. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts. MW/LW band selector switch
8. Power switch (S1-3) FM/AM band selector switch (S2-2) and, AM band selector switch is muting switch, which works to short the circuit only when the switch turned on or off.

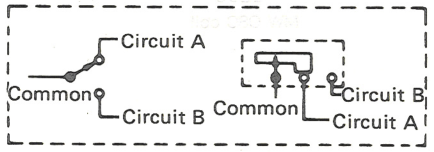
Shorting Switch

This unit uses a shorting switch. As illustated below, the circuit is shorted to the next circuit without being opened.

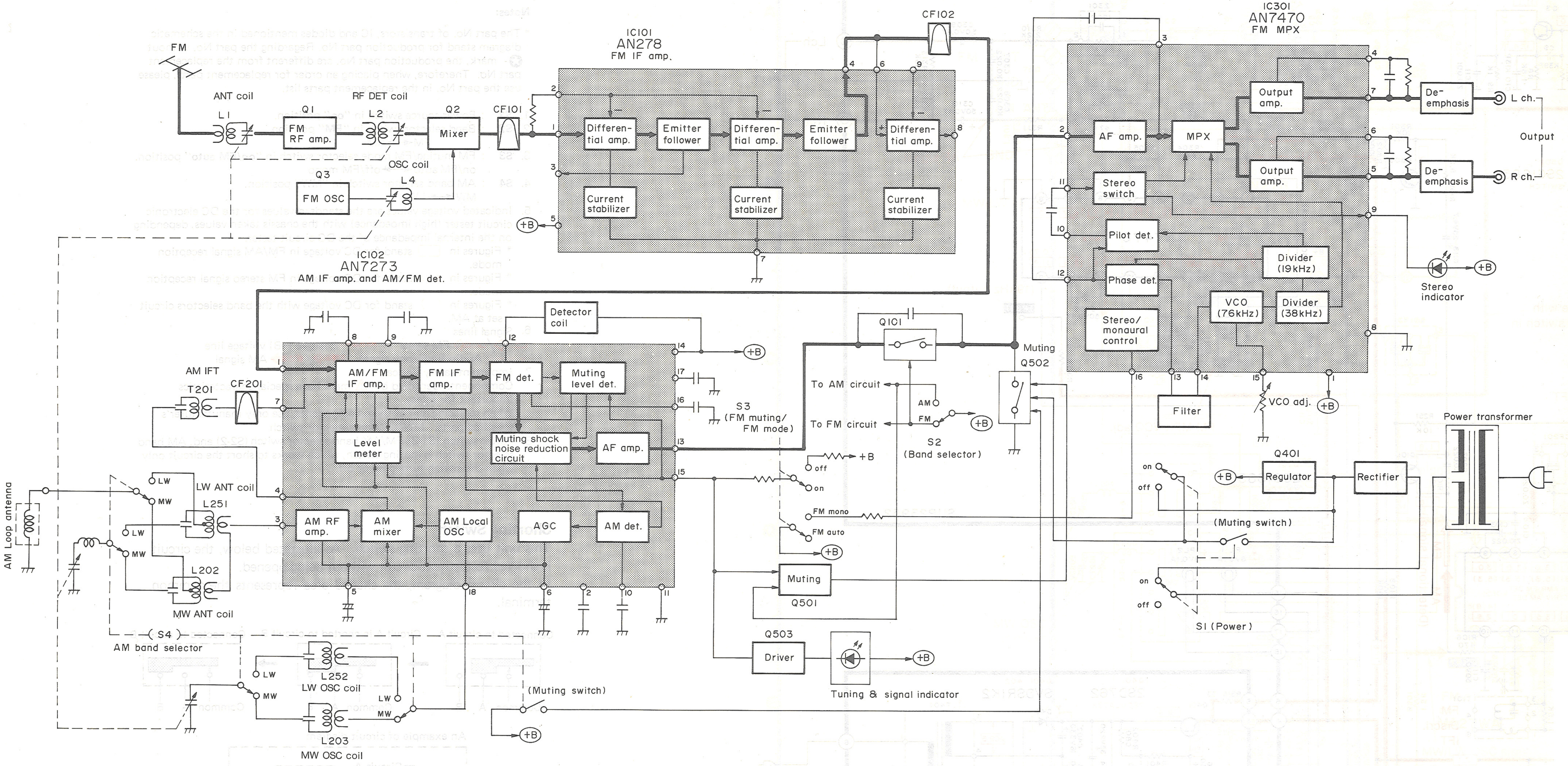
In the circuit diagram, the shaded area represents the common terminal.


Connected to circuit A
Circuit A is shorted to circuit B
Connected to circuit B
Common
A
B
Common
A
B
Common
A
B

An example of circuit diagram


Circuit A
Common
Circuit B
Common
Circuit B
Circuit A

■ BLOCK DIAGRAM


FM
ANT coil
L1
Q1
FM RF amp.
RF DET coil
L2
Q2
Mixer
CF101
OSC coil
Q3
FM OSC
L4
IC101
AN278
FM IF amp.
Differen-tial amp.
Emitter follower
Differen-tial amp.
Emitter follower
Differen-tial amp.
Current stabilizer
Current stabilizer
Current stabilizer
CF102
+B
IC102
AN7273
AM IF amp. and AM/FM det.
Detector coil
AM IFT
T201
CF201
AM/FM IF amp.
FM IF amp.
FM det.
Muting level det.
Level meter
Muting shock noise reduction circuit
AF amp.
AM RF amp.
AM mixer
AM Local OSC
AGC
AM det.
AM Loop antenna
LW
MW
LW ANT coil
L251
L202
MW ANT coil
S4
AM band selector
L252
LW OSC coil
L203
MW OSC coil
(Muting switch)
Q101
To AM circuit
To FM circuit
S3
(FM muting/ FM mode)
S2
(Band selector)
AM
FM
off
on
FM mono
FM auto
Muting
Q501
Q503
Driver
Tuning & signal indicator
Muting
Q502
IC301
AN7470
FM MPX
AF amp.
MPX
Output amp.
Output amp.
Stereo switch
Pilot det.
Phase det.
Divider (19kHz)
VCO (76kHz)
Divider (38kHz)
Stereo/ monaural control
Filter
VCO adj.
De-emphasis
De-emphasis
L ch.
R ch.
Output
Stereo indicator
Q401
Regulator
Rectifier
Power transformer
(Muting switch)
S1 (Power)

■ RESISTORS & CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics mportant for safety. When replacing any of these compoinents use only manufacturer's specified parts.
3. The "**S**" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified. All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ All capacitors are in MICROFARADS (μF) P = μμF

Numbering System of Resistor

Example :

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ± 5%

Numbering System of Capacitor

Example :

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	C : ±0.25pF
ECCD : Ceramic	1C : 16V	1 : 100V	J : ±5%
	1E : 25V		K : ±10%
ECKD : Ceramic	1H : 50V		Z : +80%, −20%
	1V : 35V		
ECQM : Polyester	50Z : 50V		
ECQP : Polypropylene	25Z : 25V		

Ref. No.	Part No.	Value
RESISTORS		
R1 S	ERD25TJ104	100k
R2 S	ERD25FJ220	22
R3 S	ERD25FJ221	220
R4 S	ERD25TJ474	470k
R5 S	ERD25FJ471	470
R6 S	ERD25TJ393	39k
R7 S	ERD25FJ822	8.2k
R8 S	ERD25FJ152	1.5k
R9 S	ERD25FJ102	1k
R101 S	ERD25FJ331	330
R102 S	ERD25FJ681	680
R103 S	ERD25FJ102	1k
R104 S	ERD25FJ471	470
R105 S	ERD25FJ152	1.5k
R106 S	ERD25FJ471	470
R107 S	ERD25FJ103	10k
R108 S	ERD25TJ104	100k
R109 S	ERD25FJ822	8.2k
R110 S	ERD25TJ274	270k
R201 S	ERD25FJ122	1.2k
R251 S	ERD25FJ103	10k
R301 S	ERD25FJ103	10k
R302 S	ERD25TJ104	100k
R303, 304 S	ERD25TJ223	22k

Ref. No.	Part No.	Value
R305 S	ERD25TJ274	270k
R306 S	ERD25TJ153	15k
R308 S	ERD25FJ103	10k
R309 S	ERD25FJ152	1.5k
R310, 311 S	ERD25FJ222	2.2k
R312, 313 S	ERD25TJ333	33k
R314 S	ERD25TJ473	47k
R315 ⚠ S	ERD25FJ330	33
R316 S	ERD25FJ102	1k
R401 S	ERD25FJ561	560
R402 ⚠ S	ERD25FJ681	680
R501 S	ERD25FJ182	1.8k
R503 S	ERD25FJ472	4.7k
R504 S	ERD25FJ392	3.9k
R505 S	ERD25FJ103	10k
R506 S	ERD25TJ333	33k
R507, 508 S	ERD25TJ563	56k
R509 S	ERD25FJ182	1.8k
R510 S	ERD25FJ562	5.6k
R512 S	ERD25FJ821	820
R513 S	ERD25FJ331	330
R514 S	ERD25FJ151	150
R515 S	ERD25FJ121	120
R516 S	ERD25FJ120	12
R517 S	ERD25FJ102	1k

Ref. No.	Part No.	Value
CAPACITORS		
C1 S	ECCD1H270KC	27P
C2 S	ECCD1H070CC	7P
C3 S	ECCD1H220KC	22P
C4 S	ECKD1H102ZF	0.001
C5 S	ECKD1H103ZF	0.01
C6 S	ECCD1H030CC	3P
C7 S	ECCD1H060CC	6P
C8 S	ECCD1H181K	180P
C9 S	ECCD1H390KC	39P
C10 S	ECCD1H150KC	15P
C11 S	ECKD1H102ZF	0.001
C101, 102 S	ECKD1H103ZF	0.01
C103, 104 S	ECKD1H223ZF	0.022
C105 S	ECKD1H223ZF	0.022
C106 S	ECEA50Z1	1
C107 S	ECKD1H103ZF	0.01
C108 S	ECEA1HS100	10
C110 S	ECCD1H101K	100P
C111 S	ECEA50ZR1	0.1
C113 S	ECEA25Z4R7	4.7
C114 S	ECKD1H223ZF	0.022
C201 S	ECCD1H020CC	2P
C202 S	ECCD1H120KC	12P
C203	ECQP1361JZ	360P

Ref. No.	Part No.	Value
C204 S	ECKD1H223ZF	0.022
C205 S	ECEA1AS101	100
C206 S	ECEA25Z4R7	4.7
C207 S	ECQM1H223JZ	0.022
C251 S	ECCD1H220KC	22P
C252 S	ECCD1H680KC	68P
C253	ECQP1181JZ	180P
C301 S	ECEA25Z4R7	4.7
C302 S	ECEA1ES101	100
C303 S	ECQM1H473JZ	0.047
C304	ECQP1471JZ	470P
C305 S	ECEA50Z1	1
C306 S	ECEA50ZR47	0.47
C307, 308 S	ECQM1H223JZ	0.022
C309, 310 S	ECEA50ZR47	0.47
C311 S	ECEA50Z3R3	3.3
C401 S	ECKD1H103ZF	0.01
C402, 403 S	ECEA1CS331	330
C404 S	ECEA1VS221	220
C406 S	ECEA1CS331	330
C501 S	ECEA1AS470	47
C503 S	ECEA1HS100	10
C504 S	ECEA50Z2R2	2.2

Printed in Japan
82034600 Ⓗ YK/IM

FM/MW/LW Stereo Tuner ST-Z25L/ST-Z25L(K)

- This booklet contains the specifications and adjusting procedures for ST-Z25L, written in Germany, French and Spanish.
- File this manual together with the ST-Z25L service manual (Order No. SD82032144C2).

DEUTSCH

TECHNISCHE DATEN

Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.

(DIN 45 500)

UKW-TUNERTEIL

Wellenbereich	88 ~ 108 MHz
Eingangsempfindlichkeit	2,0 μV (nutzbar nach IHF)
S/R 30 dB	2,0 μV (300 Ω), 1,0 μV (75 Ω)
S/R 26 dB	1,8 μV (300 Ω), 0,9 μV (75 Ω)
S/R 20 dB	1,6 μV (300 Ω), 0,8 μV (75 Ω)
Stereoumschaltschwelle bei 46 dB nach IHF	22 μV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	70 dB (78 dB nach IHF)
Stereo	65 dB (70 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+0,5 dB ~ −1,5 dB)
Trennschärfe bei Störsender normal (±400 kHz)	65 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	55 dB
ZF-Dämpfung bei 98 MHz	70 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	80 dB
AM-Unterdrückung	50 dB
Übersprechdämpfung 1 kHz	40 dB
10 kHz	30 dB
Trägerrest 19 kHz	−30 dB (−35 dB nach IHF)
38 kHz	−45 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	300 Ω (symmetrisch), 75 Ω (unsymmetrisch)

AM-TUNERTEIL

Wellenbereiche	
MW	525 ~ 1605 kHz
LW	145 ~ 350 kHz
Eingangsempfindlichkeit (S/R 20 dB)	
MW	20 μV, 300 μV/m
LW	50 μV
Trennschärfe (± 9kHz)	
MW	27 dB (1000 kHz)
LW	35 dB (250 kHz)
Spiegelfrequenz-Dämpfung	
MW	40 dB (1000 kHz)
LW	40 dB (250 kHz)
ZF-Dämpfung	
MW	65 dB (1000 kHz)
LW	40 dB (250 kHz)

ALLGEMEINE DATEN

Ausgangsspannung	0,3V (0,6V, IHF)
Leistungsaufnahme	8W
Netzspannung	Wechselstrom 50Hz/60Hz, 220V (Für Kontinentaleuropa) Wechselstrom 50Hz/60Hz, 110V/120V/220V/240V (Für andere Länder)
Abmessungen (B×H×T)	430 × 53 × 251 mm
Gewicht	2,7 kg

MESSUNGEN UND JUSTIERUNGEN

- Beim Abgleichen der hohen Frequenz ist zuerst die Spule abzugleichen (Abgleich der niedrigen Frequenz), und dann allmählich der lose Trimmer anzuziehen, um den Abgleich der hohen Frequenz vorzunehmen. Für den Abgleich der Oszillationsspule und des ZFT ist ein nichtmetallischer Schraubenzieher zu verwenden.
- Den Anzeiger vor dem Abgleich unbedingt auf den Startpunkt einstellen. (Siehe Abb. 12)

- **Stellungen und zu benutzende Geräte**

1. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM).
2. AM (MW)-Meßsender (AM-SG)
3. UKW-Meßsender (FM-SG)
4. Oszilloskop
5. Signalfrequenzmesser (meßbar für 19kHz und 108MHz).
6. Bereichsschalter . . . . AM (MW/LW Abgleich)
   FM (UKW Abgleich)
7. FM Muting/Mode Schalter. . . . . . off/FM mono.
8. Die Netzspannung auf ihren Sollwert einstellen.
9. UKW-Kunstantenne, 300 ohm . . . Vgl. Abb. 13.
10. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute ablesung.

- **Vorbereitung AM UKW-Messender (FM-SG)**

1. Stereo-Modulator an FM-SG anschließen.
2. SG-Ausgang über 300-ohm UKW Kunstantenne an den Antenneneingang des Gerätes schließen.
3. Der normale Eingang des Gerätes beträt 60 dB (1mV), 400 Hz 100% Modulation. (Wegen Verwendung der Kunstantenne muß der Signalausgang 12 dB plus (IHF) sein: d.h. beim Eingang von 60 dB soll der Signalausgang 72 dB sein.)

Nr.	AM MESSENDER ANSCHLUSS	AM MESSENDER FREQUENZ	SKALENZEIGEREINSTELLUNG DES TUNER	ANZEIGEGEIRÄT (Röhrenvoltmeter order Oszillograph)	ABGLEICHSPUNKTE	BEMERKUNGEN
	AM (MW/LW)-ZF-ABGLEICH					
1	Einen MW-Signalgenerator über einen 200pF Kondensator mit dem MW-Antenneneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Starker Eingang)	450kHz (400 Hz Modulat., 30%)	Kein Empfang	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	T201 (1. IFT)	Die Eingangsfrequenz und die Einstellungspunkte so adustieren, daß der Ausgang den maximalen Wert erreicht.
	MW-HF-ABGLEICH					
2	Einen MW-Signalgenerator über einen 200pF Kondensator mit dem MW-Antenneneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	600kHz (400 Hz Modulat., 30%)	600kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	L203 (MW Osc. Spule) L202 (MW Ant. Spule)	• Auf max. Ausgang abgleichen.
3		1500kHz (400 Hz Modulat., 30%)	1500kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	CT201 (MW Osc. Trimmer)	• Auf max. Ausgang abgleichen. • Schritt (2) und (3) sind zu wiederholen.
	LW-HF-ABGLEICH					
4	Einen MW-Signalgenerator über einen 200pF Kondensator mit dem MW-Antenneneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	145kHz (400 Hz Modulat., 30%)	145kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	L252 (LW Osc. Spule) L251 (LW INT Ant. Spule)	• Auf max. Ausgang abgleichen.
5		350kHz (400 Hz Modulat., 30%)	350kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	CT251 (LW Osc. Trimmer)	• Auf max. Ausgang abgleichen. • Schritt (4) und (5) sind zu wiederholen.
	UKW-ZF-ABGLEICH					
6		Kein Signal	Kein Empfang	Ein Gleichstromrörenvoltmeter zwischen TP101 und TP102 über eine Drosselspule verbinden (siehe Abb. 14)	T101 (Diskriminator FT)	• FM muting/FM mode. Schalter, auf "on/FM auto" stellen. • Den Kern von T101 so justieren, daß die gemessene Spannung im signallosen Modus 0mV im 300mV Bereich beträgt.
	UKW-HF-ABGLEICH					
7	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	87.5MHz (400 Hz Modulat., 100%) Schwacher Eingang)	87.5MHz (Frequenz-min.)	Oszillograph über den Ausgang "OUTPUT" schließen.	L4 (Osc. Spule)	• Einen schwachen Eingang geben, bei dem Geräusch in der Ausgangswellenform enthalten wird. • So einstellen, daß die Ausgangswellenform vertikal symmertrisch wird. (Abb. 15) • Die Einstellung von (7), (8) und (9) wieder holen, bis die Frequenz mit der Skala übereinstimmt.
8		90MHz (400 Hz Modulat., 100%) Schwacher Eingang	90MHz	Oszillograph über den Ausgang "OUTPUT" schließen.	L1 (Ant. Spule) L2 (Det. Spule)	
9		106MHz (400 Hz Modulat., 100%) Schwacher Eingang)	106MHz	Oszillograph über den Ausgang "OUTPUT" schließen.	CT1 (Osc. Trimmer)	

UKW-STEREO-DEKODER-ABGLEICH

Nr.	UNTER VERWENDUNG EINES ZÄHLERS	ALTERNATIV-MEß METHODE
10	1. Unmodulierts Mono-Signal 100MHz in das Gerät speisen. 2. FM muting/mode-Schalter auf "on/FM auto" stellen. 3. Zähler über einen Widerstand 100k ohm an TP301 schließen. 4. **VR301** auf 19kHz ± 30 Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. oder einem Sender einspeisen. 2. **VR301** so einstellen, bis die Stereolampe auf leuchtet. Schleifer von **VR301** sichern, wie in Abb. 16 gezeigt.

FRANÇAIS

CARACTERISTIQUES

Sujet á changement sans prearis.

(DIN 45 500)

SECTION SYNTONISATEUR FM

Gamme de fréquence	88~108 MHz
Sensibilité	2,0 µV (IHF utilisable)
S/B 30 dB	2,0 µV (300Ω), 1,0 µV (75Ω)
S/B 26 dB	1,8 µV (300Ω), 0,9 µV (75Ω)
S/B 20 dB	1,6 µV (300Ω), 0,8 µV (75Ω)
Sensibilité stéréo au seuil de 46 dB, IHF	22 µV/75Ω
Distorsion harmonique totale	
MONO	0,15%
STEREO	0,3%
Signal/Bruit	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Réponse de fréquence	20 Hz~15 kHz, +0,5 dB~ −1,5 dB
Sélectivité alternée par canal normal (±400 kHz)	65 dB
Taux de capture	1,0 dB
Rejection d'image à 98 MHz	55 dB
Rejection FI à 98 MHz	70 dB
Rejection de réponse parasite à 98 MHz	80 dB
Suppression AM	50 dB
Séparation stéréophonique	
1 kHz	40 dB
10 kHz	30 dB
Fuite de porteuse	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz)	±1,5 dB
Point de limite	1,2 µV
Largeur de bande	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
Bornes d'antenne	300Ω (symétrique) 75Ω (asymétrique)

SECTION SYNTONISATEUR AM

Gamme de fréquence	
PO (MW)	525~1605 kHz
GO (LW)	145~350 kHz
Sensibilité (S/B 20 dB)	
PO (MW)	20 µV, 300 µV/m
GO (LW)	50 µV
Sélectivité (±9 kHz)	
PO (MW)	27 dB (1000 kHz)
GO (LW)	35 dB (250 kHz)
Réjection d'image	
PO (MW)	40 dB (1000 kHz)
GO (LW)	40 dB (250 kHz)
Réjection FI	
PO (MW)	65 dB (1000 kHz)
GO (LW)	40 dB (250 kHz)

DIVERS

Tension de sortie	0,3V (0,6V, IHF)
Consommation	8W
Alimentation	220V
Dimensions (L×H×Pr)	430 × 53 × 251 mm
Poids	2,7 kg

MESURAGES ET RÉGLAGES

- Lorsque l'on régle la haute fréquence, régler tout d'abord la bobine (mise au point de la fréquence inférieure), puis graduellement resserrer le condensateur d'appoint desserré pour effectuer le réglage de la haute fréquence. Utiliser un tournevis non-métallique lorsque l'on régle la bobine oscillatrice et IFT (transformateur de fréquence intermédiaire).
- S'assurer que l'indicateur est réglé sur le point de départ avant d'effectuer la mise au point. (Voir Fig. 12)

- **Réglage et équipement utilisé**

1. Voltmètres électronique de courant alternatif et de courant continu (VTVM).
2. Générateur du signal AM (AM-SG).
3. Générateur du signal FM (FM-SG).
4. Oscilloscope
5. Compteur de fréquence (19kHz et 108MHz mesurable).
6. Sèlecteur de gamme. . . . . {AM (Alignement MW/LW)
FM (Alignement FM)
7. Commutateur de silencieux/mode. . . . off/FM mono.
8. Conserver la tension du secteur à la tension nominale.
9. Antenne fictive FM 300Ω. . . . . . Voir fig. 13.
10. Le signal du générateur ne doit pas étre plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.

- **Préparation du générateur de signal FM (FM-SG)**

1. Brancher la commande de réglage stéréophonique à FM-SG.
2. Alimenter la sortie SG à la borne de l'antenne de l'appareil, par l'antenne fictive FM, 300 ohms.
3. L'entrée standard de l'appareil est de 60 dB (1mV), 400Hz, 100% de modulation (à cause de l'utilisation de l'antenne fictive, la sortie SG doit être de plus 12 dB (IHF). Ce qui signifie que quand l'entrée est de 60 dB, la sortie SG doit être de 72 dB).

No.	AM GENERATEUR		AIGUILLE SUR LE CADRAN	INDICATEUR (VOLT-METRE ELECTRONIQUE OSCILLOSCOPE)	POINTS DE REGLAGE	OBSERVATIONS
	BRANCHEMENT	FREQUENCE				
	RÉGLAGE DE FI-MW (PO)-LW (GO)					
1	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis (Entrée sous puissante)	450kHz (modulè à 30% par 400 Hz)	Point sans signal	C.A. voltmètre èlectronique ou oscilloscope sur prise de sortie de l'appareil.	T201 (1 transfo FI)	• Régler la fréquence d'entrée et les points de réglage de tells sorte que la sortie devienne maximale.
	RÉGLAGE DE RF-MW (PO)					
2	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée faible)	600kHz (modulé à 30% par 400 Hz)	600kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	L203 (bobine OSC MW) L202 (bobine ANT MW)	• Réglez au maximum de signal de sortie.
3		1500kHz (modulé à 30% par 400 Hz)	1500kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	CT201 (trimmer OSC MW)	• Réglez au maximum de signal de sortie. • Recommencez les étapes (2) et (3).
	ALIGNEMENT RF-LW (GO)					
4	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée faible)	145kHz (modulé à 30% par 400 Hz)	145kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	L252 (bobine OSC LW) L251 (bobine ANT LW INT)	• Réglez au maximum de signal de sortie.
5		350kHz (modulé à 30% par 400 Hz)	350kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	CT251 (trimmer OSC LW)	• Réglez au maximum de signal de sortie. • Recommencez les étapes (4) et (5).
	RÉGLAGE DE FI-FM					
6	————	Sans signal	Point sans signal	Brancher le voltmétre électronique à C.C. aux bornes TP101 et TP102 (Voir la fig. 14)	T101 (Transfo FI discri.)	• Commutateur de silencieux sur "on/FM auto". • Régler le noyau T101 de telle sorte que le voltage mesuré dans le mode sans signal, soti de 0mV dans la gamme des 300mV.
	RÉGLAGE DE RF-FM					
7	Branchez sur la prise d'antenne FM à travers une antenne fictive FM.	90 MHz (modulé à 100% par 400 Hz) Entrée faible	90 MHz	Oscilloscope sur prise de sorite du tuner.	L4 (bobine OSC) L1 (bobine ANT) L2 (bobine DET)	• Appliquer une entrée faible de telle sorte que le parasite soit compris dans la forme de l'onde de sortie. • Faire le réglage de telle sorte que la forme de l'onde de sortie soit verticalement symétrique. (Voir fig. 15) • Refaire les réglages (7) et (8) jusqu'à ce que la fréquence corresponde correctement avec l'échells du cadran.
8		106 MHz (modulé à 100% par 400 Hz) Entrée faible	106 MHz	Oscilloscope sur prise de sortie du tuner.	CT1 (trimmer OSC)	

RÉGLAGE PILOTE MULTIPLEX FM

No.	AVEC UN ERÉQUENCEMÉNTRE	PAR UN OUTRE SYSTÈME
9	1. Signal mono 100MHz non modulé appliqué à l'appareil. 2. Commutateur de silencieux sur "on/FM auto". 3. Branchez le fréquencemètre sur TP301 à travers une 4. Régler **VR301** sur 19kHz ± 30 Hz.	1. Appliquez à l'appareil un signal stéréo provenant d'un générateur ou de la réception d'un émetteur. 2. Régler **VR301** jusqu à ce que l'indicateur de stéréophonic s'allume. Collez le curseur le **VR301** comme indiqué sur la fig. 16.

ESPAÑOL

ESPECIFICACIONES

Estas especificaciones están sujetas a cualquier cambio sin previo eviso.

(DIN 45 500)

SECCION PARA SINTONIZADOR FM

Gama de frecuencias	88~108 MHz
Sensibilidad	2,0 µV (IHF, utilizable)
Señal a ruido 30 dB	2,0 µV (300Ω), 1,0 µV (75Ω)
Señal a ruido 26 dB	1,8 µV (300Ω), 0,9 µV (75Ω)
Señal a ruido 20 dB	1,6 µV (300Ω), 0,8 µV (75Ω)
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 µV/75Ω
Distorsión armónica total	
MONO. (MONO)	1,5%
ESTEREO (STEREO)	0,3%
Relación de señal a ruido	
MONO. (MONO)	70 dB (78 dB, IHF)
ESTEREO (STEREO)	65 dB (70 dB, IHF)
Respuesta de frecuencia	20 Hz~15 kHz, +0,5 dB~ −1,5 dB
Selectividad alternada de canal normal ±400 kHz)	65 dB
Relación de captura	1,0 dB
Rechazo de imagen a 98 MHz	55 dB
Rechazo de F.I. a 98 MHz	70 dB
Rechazo de respuesta espuria a 98 MHz	80 dB
Supresión AM	50 dB

Separación estereofónica	
1 kHz	40 dB
10 kHz	30 dB
Fuga de onda portadora	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Equilibrio de canales 250 Hz~6 300 Hz	±1,5 dB
Punto de límite	1,2 μV
Ancho de banda	
Amplificador FI	180 kHz
Demodulador FM	1000 kHz
Bornes de antena	300Ω (equilibrado), 75Ω (no equilibrado)

■ SECCION PARA SINTONIZADOR AM

Gama de frecuencias	
OM (MW)	525~1605 kHz
OL (LW)	145~350 kHz
Sensibilidad (Relación de señal a ruido de 20 dB)	
OM (MW)	20 μV, 300 μV/m
OL (LW)	50 μV
Selectividad (± 9kHz)	
OM (MW)	27 dB (1000 kHz)
OL (LW)	35 dB (250 kHz)
Rechazo de imagen	
OM (MW)	40 dB (1000 kHz)
OL (LW)	40 dB (250 kHz)
Rechazo de F.I.	
OM (MW)	65 dB (1000 kHz)
OL (LW)	40 dB (250 kHz)

■ GENERAL

Voltaje de salida	0,3V (0,6V, IHF)
Consumo de energía	8W
Requisito de energía	AC 50Hz/60Hz, 220V (Para Europa continental) CA 50Hz/60Hz, 110V/120V/220V/240V (Para otros países)
Dimensiones (An.×Al.×Prof.)	430 × 53 × 251 mm
Peso	2,7 kg

■ MEDICIONES Y AJUSTE

- Al ajustar la alta frecuencia, primero ajustar la bobina (ajuste de frecuencia inferior) y entonces, gradualmente, apretar el trimer flojo para efectuar el ajuste de alta frecuencia. Utilizar un destornillador no metálico al ajustar la bobina de oscilación y IFT (transformador de frecuencia intermedia).
- Asegurarse de que el indicador está puesto en el punto de arranque antes del ajuste. (Véase la Fig. 12.)

- **Puesta y Uso de equipo**

1. Voltimetros electónicos de CA y CC (VTVM).
2. Generador de señales AM (AM-SG).
3. Generador de señales FM (FM. SG).
4. Osciloscopio.
5. Frecuencimetro (19kHz y 108MHz medibles).
6. Selector de bande .... {AM (Ajuste de MW/LW)
   {FM (Ajuste de FM)
7. Interruptor silenciador/modalidad FM ..... off/mono.
8. Mantener voltaje de línea a voltaje nominal.
9. Antena ficticia de 300Ω FM. .... Referir a Fig. 13.
10. La salida de generador de señales no debe ser mayor que la necesaria para obtener una lectura de salida.

- **Preparación de generador de señales FM (FM. SG).**

1. Conectar modulador estereofónico a FM. SG.
2. Aplicar salida SG a terminal de antena del aparato a través de antena ficticia de 300Ω FM.
3. La entrada standard del aparato es 60dB (1mV), modulación 100% 400Hz (Por el uso de antena ficticia, la salida de SG ha de ser 12dB más (IHF). Es decir, cuando entrada es 60dB, salida de SG ha de ser 72dB).

	AM/FM GENERADOR DE SEÑALES		A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE IF-MW (OM)-LW (OL)					
1	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF. Común a chasis. (Entrada potente.)	450kHz (Mod. 30% con 400Hz)	Punto de no interferencia.	Conecart VTVM de CA u osciloscopio a terminales de "OUTPUT" (altavoz).	T201 (IFT AM)	Ajuste la frecuencia de entrada y el punto de ajuste de manera que la salida se convierta en máxima.
	AJUSTE RF-MW (OM)					
2	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF. Común a chasis. (Entrada débil).	600kHz (Mod. 30% con 400Hz)	600kHz	Conectar VTVM de CA u osciloscopio a terminales de "OUTPUT".	L203 (Bobina OSC MW) L202 (Bobina ANT MW)	• Ajustar para salida máxima.
3		1500kHz (Mod 30% con 400Hz)	1500kHz	Conectar VTVM de CA u osciloscopio a terminales de "OUTPUT".	CT201 (Trimer de OSC AM)	• Ajustar para salida máxima. • Repetir pasos (1) y (2).
	AJUSTE RF-LW (OL)					
4	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF. Común a chasis. (Entrada débil).	145kHz (Mod. 30% con 400Hz)	145kHz	Conectar VTVM de CA u osciloscopio a terminales de "OUTPUT".	L252 (Bobina OSC LW) L251 (Bobina ANT LW)	• Ajustar para salida máxima.
5		350kHz (Mod. 30% con 400Hz)	350kHz	Conectar VTVM de CA u osciloscopio a terminales de "OUTPUT".	CT251 (Trimer de OSC LW)	• Ajustar para salida máxima. • Repetir pasos (4) y (5).

	AM/FM GENERADOR DE SEÑALES		A FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE IF-FM					
6	———	No señal.	Punto de no interferencia.	Conectar VTVM CC entre terminal TP101 y TP102 a través de bobina de choque. (Referir a Fig. 14).	T101 (Discri. IFT)	• Ajustar núcleo de T101 de manera que voltaje medido en modalidad de señal se 0mV en gama de 300mV.
	AJUSTE RF. FM					
7	Conectar FM. SG a terminal de antena FM a través de antena ficticia de 300Ω FM.	90MHz (Mod. 100% con 400Hz) Entrada débil.	90MHz	Conectar osciloscopio a terminal de "OUTPUT".	L4 (Bobina OSC) L1 (Bobina ANT) L2 (Bobina DET RF)	• Añadir entrada débil de manera que ruido se incluya en la forma de onda de salida. • Hacer el ajuste de manera que la forma de onda de salida sea verticalmente simétrica. (Fig. 15). • Repetir los pasos (7) y (8) hasta que la frecuencia se adapte correctamente a la escala del cuadrante.
8		106MHz (Mod. 100% con 400Hz) Entrada débil.	106MHz	Conectar osciloscopio a terminal de "OUTPUT".	CT1 (Trimer OSC)	

	AJUSTE DE V.C.O MPX de FM	
	USANDO UN FRECUENCIMETRO	USANDO SISTEMA ALTERNATIVO
9	1. Señal mono no modulada de 100MHz 60dB aplicada al aparato. 2. Interruptor de modalidad/sinlenciador FM a "on/auto FM". 3. Conectar frecuéncimetro a TP301 a través de resistor (100kΩ). 4. Ajustar **VR301** a 19kHz ± 30Hz.	1. Aplicar señal estereofónica de generador o estación estereofónica a sintonfizador. 2. Ajustar **VR301** hasta que indicador estereofónico se ilumina. Brazo de cemento de **VR301** como se muestra en la Fig. 16.

Printed in Japan
82034600 Ⓗ YK/IM